Strathclyde Institute of Pharmacy and Biomedical Sciences

BM329
Biomedical Microbiology

Date: 18th April 2023 **Time: 09:30 – 11:30**
Duration: 2 hours

INSTRUCTIONS

The exam consists of two sections

Attempt Question 1 (Compulsory) in Section A (30%)

AND

Attempt TWO Questions (equal weighting) in Section B (70%)

Use ONE answer booklet for SECTION A

Use a SEPARATE answer booklet for EACH question in SECTION B

Put the question number and your registration number on each book

SECTION A

Attempt Question 1 (Compulsory) in Section A (30%)

Use ONE answer booklet for Section A

1. As a microbiologist at Glasgow Royal Infirmary, you are presented with the following information:

Clinical presentation:
The patient has recently had a catheter fitted and has presented with an inflamed skin area, rash, and localised swelling around the site.

Lab results from skin swab culture:

Gram Stain	Cell Shape	Cell Colour	Cell Arrangement	Biochemical Test	Cytotoxins produced	Antibiotic sensitivity
Purple	Cocci	Pale yellow	Clusters	Presence of both coagulase and Protein A; Catalase +ve	alpha toxin, beta toxin (also called sphingomyelinase C), delta toxin, gamma toxin, and Panton-Valentine (P-V) leukocidin	Inconclusive (failed test)

a) What is the infectious agent and is it Gram positive or negative?

(10%)

b) What biochemical tests are defining for the genus *and* species, and why?

(20%)

c) What virulence factors contribute to the agent's pathogenicity?

(20%)

d) When repeating the antibiotic sensitivity test, what method and antibiotic would you use and why?

(20%)

e) On a petri dish you are presented with two different species of this genus to compare your culture to, but someone forgot to label the petri dish. Half the plate looks pink, and the other half is yellow. What media has been used, what are the two strains and why are there different colours?

(30%)

END OF SECTION A

PLEASE TURN OVER

SECTION B

Attempt TWO Questions (equal weighting) in Section B (70%)

Use a SEPARATE answer booklet for EACH question in SECTION B

2. Using examples, discuss how viruses can be classified based on their genetic material and method of replication.

3. Compare and contrast chromosomal gene organisation, gene expression and RNA-splicing in trypanosomatids with higher eukaryotes.

4. A patient has presented to your clinic with diarrhoea, abdominal pain and cramps. A Gram negative bacillus, presumed to be the infectious agent, was isolated in high numbers from a stool sample. Describe how you would identify this organism (50%) and what treatment(s) you would recommend for the patient (50%).

5. Discuss the genome structure and organisation of Influenza virus and how this can contribute to the emergence of seasonal and pandemic strains of the virus.

6. Describe the factors contributing to the development of candidemia in hospitalised patients?

END OF SECTION B

END OF PAPER

Module Co-ordinator: Dr Katherine Duncan